

**REMARKS**

Claims 1 – 45 are pending in the application, of which Claims 36 – 43 are withdrawn from current consideration. Claims 1, 8, 15, 34, 35, 44, 45 are currently amended.

**Claim Rejections – 35 USC § 103**

The Examiner rejects claims 1-7, 15-17, 20-28, 31-35, 44 and 45 under 35 U.S.C. 102(e) as being unpatentable over Sato et al. U.S. Patent No. 6,388,667 in view of Gagin et al U.S. Patent No. 5,630,757

The Examiner further rejects claims 8-12, 13, 14, 18, 19, 29, and 30 under U.S.C. 103(a) as being unpatentable over Sato et al. U.S. Patent No. 6,388,667 in view of Matsuda U.S. Patent No. 6,734,885.

The present invention, as described in the field of invention section, relates to interaction with and positioning of virtual objects in virtual environments. More particularly, the present invention relates to permissible movements of three dimensional objects in virtual environments. The present invention discloses the novel and inventive idea of an encapsulated virtual object which is splittable between two or more terminals. The present invention also teaches the novel and inventive idea of restricting the number of virtual objects involved in a chain of consequential interactions of a virtual object with further virtual objects when a maximum number of interacting objects is involved in the chain of consequential interactions (By restricting the length of any chain or the overall total number in the chains). The

present invention further discloses the idea of identifying the interacting objects via a logical query.

Sato teaches, as described in the summary of invention section, an image generation device and information storage medium that can simplify the construction of a virtual world for image generation.

Gagin describes a multi user game playing environment which provides game playing services to cable television subscribers over existing cable networks. The Gagin playing environment is implemented using a client-server architecture. With Gagin, graphical aspects *of the whole game* are managed locally at a client terminal, whereas status information of the whole game is stored both at the server and at client terminals.

Matsuda, as described in the background of invention section relates to an information processing apparatus and method for presenting a three dimensional space. With Matsuda, a user is capable of operating an avatar to communicate with other avatars operated by other users.

Favorable reconsideration of this rejection in view of the above amendments and the following explanations is respectfully requested.

**Claim 1** as amended defines an encapsulated virtual object for use in an object oriented environment; the virtual object comprising at least a user-sensible aspect and further comprising at least a functional aspect, the user-sensible aspect being encapsulated as a user-sensible encapsulation, separately from the functional aspect,

*the virtual object being splittable by locating respective user-sensitive and functional encapsulations of the same virtual object at different terminals.*

Thus the virtual objects taught by the present invention is an encapsulated object, which may be *split* between two or more terminals, based on the separate encapsulation of their visual and functional parts. Consequently, with the present invention, a virtual object may be presented and operated on a remote terminal which downloads only its visual part, whereas its functional part remains only on a central server, where it is centrally managed as an object which may be visualized differently at each terminal, and each terminal may download a different part of the visual part of the object or view different parts of the same downloaded object or part thereof.

For example, with the present invention, a computer game may feature several players, where each of the players is controlled by a certain user. Each of the players may be OOP (Object Oriented Programming) encapsulated, such that the object's visual aspects are encapsulated separately from the object's functional aspects. Consequently, each user only has to download the visual parts of his player and players interacting with him, while the functional aspects of the players as well as all aspects of other objects of the game are stored only on the central server, as described above.

This novel idea, as introduced by the present invention, may save bandwidth when the terminal and server communicate over a network and also allows for faster interaction over a network, with less delay for downloading new objects and fewer demands on the resources of the local users. Thus in an interactive game with

multiple users, the central server carries out most of the processing and far less processing and in particular far less duplication occurs at the remote terminals.

Sato (US Pat. No. 6388667) discloses a totally different environment for the development of virtual reality applications than the one introduced in this invention. With the Sato environment, the actor is provided with both characteristics as objects and characteristics as processes (column 8, line 14). However the Sato environment actor is *not a splittable* object, such that its user-sensible aspect and its functional aspect can be *separated onto different terminals*. In other words, Sato does not teach or even hint at the idea of *splitting a virtual object* between different terminals as taught by the present invention, and defined by claim 1.

Gagin at al U.S. Patent No. 5,630,757 describes a gaming environment implemented using a client/server architecture. With Gagin, graphical aspects *of the game* are managed locally at a client terminal, whereas status information *of the game* is stored both at the server and at client terminals. However Gagin never teaches a virtual object as known from Object Oriented Programming. More specifically, Gagin never teaches or even hints at the idea of *splitting a virtual object* between different terminals as taught by the present invention, and defined by claim 1.

That is to say that with Gagin the user has to download data pertaining to the whole scene of the game, and not only specific objects such as an object representing a game actor controlled by a specific user in his terminal.

It is thus respectfully believed that claim 1 as amended is novel and inventive over the prior art and should be allowed.

**Claim 8** defines a first virtual object within a virtual computing environment, the first virtual object having a relationship with a second virtual object, the relationship being such that an interaction with the first virtual object is operable to bring about a consequential interaction with at least the second object, the virtual computing environment comprising a method for restricting the number of consequential interactions of a virtual object with further virtual objects when *a maximum number of interacting objects* is involved in the consequential interactions.

Sato fails to disclose the bringing about of such a consequential interaction and a method for *restricting the number of consequential interactions* of a virtual object with further virtual objects when *a maximum number of objects* are involved in the consequential interactions.

Matsuda U.S. Patent No. 6,734,885 does recognize it is necessary to impose an upper limit on the number of clients allowed to participate in the 3-dimensional virtual space in Column 2, line 31. However, the idea of limiting the number of users, though it may *indirectly* lower the number of interacting objects in some very special circumstances, is totally different than the novel idea of *directly* limiting the *number of interacting objects* itself, as taught by the present invention. The motivation behind limiting the *number of interacting objects* may be independent of efficiency and system loads considerations and may have to do with logical application considerations. For examples, the present invention introduced virtual objects that may be used to present family members in a family tree, and a limitation may be set for presenting only close family members of first and second degrees.

It is thus respectfully believed that claim 8 as previously presented is both novel and inventive over the prior art and should be allowed.

**Claim 15** defines an encapsulated virtual reality environment comprising a scene and at least one virtual object supported by a scene database, the scene database having at least a first interchangeable functional unit associated therewith, the first interchangeable functional unit comprising functionality for the at least one first virtual object, the virtual reality environment configured to support a method for facilitating interaction by a plurality of users at a plurality of client terminals with the at least one first object, the first object having display and interaction characteristics and functional characteristics, the method comprising: encapsulating the display and interaction characteristics in a display part of the first object, encapsulating functional characteristics in a functional part of the first object, downloading the display part of the first object to user client terminals, and retaining the functional part of the first object at a remote location networked with the user client terminals, thereby facilitating *splitting the first virtual object between two terminals*.

As described above for claim 1, Sato discloses a totally different environment for the development of virtual reality applications than the one introduced in this invention. The Sato environment actor is *not a splittable* object, such that its user-sensible aspect and its functional aspect can be separated. In other words, Sato does not teach or even hints at the idea of splitting a virtual object between different terminals as taught by the present invention and defined by claim 15.

As discussed above, Gagin at al U.S. Patent No. 5,630,757 describes a gaming environment implemented using a client/server architecture. With Gagin, graphical aspects *of the whole game* are managed locally at a client terminal, whereas status information *of the whole game* is stored both at the server and at client terminals. However Gagin never teaches an encapsulated virtual object as known from Object Oriented Programming. More specifically, Gagin never teaches or even hints at the idea of *splitting an encapsulated virtual object* between different terminals as taught by the present invention, and defined by claim 15.

It is thus respectfully believed that claim 15 as amended is novel over the prior art and should be allowed

**Claim 34** defines a dedicated control element for controlling the functionality of virtual objects belonging to a set of virtual objects within a virtual reality environment, the dedicated control element being associated with the virtual reality environment, and comprising: identification functionality for determining whether a virtual object within the virtual reality environment is a member of the set, and control functionality for processing events received from the identified virtual object, the control functionality being operable to bring about a consequential interaction of the virtual object with further virtual objects, and to *restrict the number of consequential interactions of a virtual object with further virtual objects when a maximum number of interacting objects* is involved in the consequential interactions

As described above for claim 8, neither Sato nor Matuda ever discloses or even hints at such a method for restricting the number of consequential interactions of a virtual

object with further virtual objects *when a maximum number interacting objects is reached.*

It is thus respectfully believed that claim 34 as amended is both novel and inventive over the prior art and should be allowed.

**Claim 35** defines a method for facilitating interaction by a plurality of users at a plurality of client terminals with at least a first encapsulated object, the first object having display and interaction characteristics and functional characteristics, in a networked virtual reality environment, the method comprising: encapsulating the display characteristics in a display and interaction part of the first object, encapsulating functional characteristics in a functional part of the first object, downloading the display and interaction part of the first object to user client terminals, and retaining the functional part of the first object at a remote location networked with the user client terminals *thereby facilitating splitting the first virtual object between two terminals.*

As described above for claim 1, neither Sato nor Gagin teaches or even hints at the idea of an encapsulated virtual object that may be split between different terminals, such that one user client terminal may download the visual part of the object only and present the object while the functional part of the same object is retained at a remote location which is networked with the user client terminal, as taught by the present invention.



It is thus respectfully believed that claim 35 as amended is novel over the prior art and should be allowed.

**Claim 44** defines a method for controlling the functionality of a set of virtual objects within a virtual reality environment, comprising: incorporating allowable functionality for the set of virtual objects within a dedicated control element associated with the virtual reality environment, incorporating identification functionality within the dedicated control element to enable the dedicated control element to distinguish between virtual objects within the set and virtual objects not within the set, and thereby allowing the dedicated control element to control virtual objects within the set, the control element comprising a method for facilitating interaction by a plurality of users at a plurality of client terminals with at least a first encapsulated virtual object, the virtual object comprising at least a user-sensible aspect and further comprising at least a functional aspect, the user-sensible aspect being encapsulated as a user-sensible encapsulation, separately from the functional aspect, thereby *facilitating splitting the first virtual object between two terminals*.

As described above for claim 1, neither Sato nor Gagin ever teaches or even hints at the idea of a method for controlling the functionality of an encapsulated virtual object that may be split between different terminals, such that one user client terminal may download the visual part of the object only and present the object while the functional part of the object is retained at a remote location which is networked with the user client terminal, as taught by the present invention. Furthermore, neither Sato nor

Gagin ever teaches or even hints at a control element capable of declaratively specifying and identifying a set of objects.

It is thus respectfully believed that claim 44 as amended is novel over the prior art and should be allowed.

**Claim 45** defines a method for facilitating interaction by a plurality of users at a plurality of client terminals with at least a first encapsulated virtual object, the first object having display characteristics and functional characteristics, in a networked virtual reality environment, the method comprising: encapsulating the display characteristics in a display and interaction part of the first object, encapsulating functional characteristics in a functional part of the first object, downloading the display and interaction part of the first object to user client terminals, and retaining the functional part of the first object at a remote location networked with the user client terminals, thereby *facilitating splitting the first virtual object between two terminals*, the interactions comprising trading using the objects.

As described above for claim 1, neither Sato nor Gagin ever teaches or even hints at the idea of a method for facilitating interaction by a plurality of users at a plurality of client terminals with at least a first encapsulated virtual object, the virtual object being splittable between two terminals, as taught by the present invention.

It is thus respectfully believed that claim 45 as amended is novel over the prior art and should be allowed.

The remaining claims mentioned in this section of the Office Action are believed to be allowable as being dependent on an allowable main claim.

All of the matters raised by the Examiner have been dealt with and are believed to have been overcome.

In view of the foregoing, it is respectfully submitted that all the claims now pending in the application are allowable.

An early Notice of Allowance is therefore respectfully requested.

Respectfully submitted,



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Encl.:

Petition for Extension of Time (1 Month)